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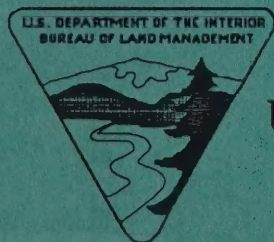
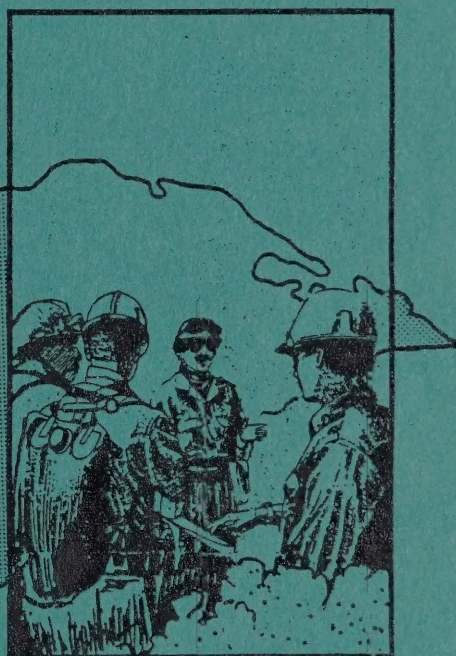
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# Honduras Fire Management Appraisal

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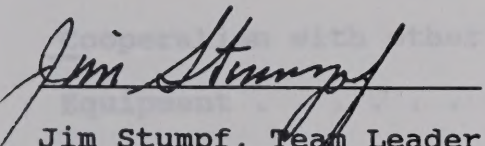
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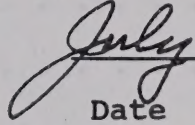


TABLE OF CONTENTS  
FIRE MANAGEMENT ASSESSMENT  
BUREAU OF LAND MANAGEMENT

## FORWARD

The findings and recommendations contained in this report are a result of the fire management assessment in Honduras March 16-27 and April 20 to May 2, 1992. The visits were a followup to the Technical Fire Management Team visit to Honduras in October 1991. This report is intended to establish the framework for long term fire management assistance between Honduras and the Department of the Interior.

  
Jim Stumpf, Team Leader  
Bureau of Land Management  
Fire Management Specialist  
Division of Fire Policy, Management  
and Budget

  
Date

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TABLE OF CONTENTS

FIRE MANAGEMENT ASSESSMENT

BUREAU OF LAND MANAGEMENT

AND THE

REPUBLIC OF HONDURAS

Objectives . . . . .	1
Management Organization . . . . .	2
Policy and Budget . . . . .	7
Planning . . . . .	9
Statistics . . . . .	11
Fire Prevention . . . . .	13
Fire Suppression . . . . .	15
Fire Effects . . . . .	18
Cooperation with other Honduran Agencies . . . . .	20
Equipment . . . . .	22
Communications . . . . .	24
Technical Capability . . . . .	25
Commitment . . . . .	26
Action Plan . . . . .	27
Trip Log . . . . .	31
Training Team Report . . . . .	43

Brigades (Honduran Fire Crews) with current state-of-the-art, hands-on training in suppression, organization, fire tactics and strategy, fire behavior, safety, and fire equipment maintenance practiced in the United States.







REPUBLIC OF HONDURAS  
FIRE MANAGEMENT ASSESSMENT

AND

ACTION PLAN

INTRODUCTION

The Bureau of Land Management (BLM) conducted a Technical Assistance trip to Honduras in October 1991. As a result, a request was received from the Agency for International Development (US-AID) for a comprehensive review of the Honduran fire program (COHDEFOR). The Honduran Forest Development Corporation (COHDEFOR) is the quasi-government institution charged with the responsibility of forest management and conservation. This review was conducted by Jim Stumpf and Dick O'Connell of the BLM's National Fire Management Office during March 16-27 and April 20-May 2, 1992. This report consists of their findings, recommendations, and a summary of activities on their assignment.

OBJECTIVES

U.S. AID requested an analysis and recommendation of the capability of COHDEFOR's ability and willingness to make an effort toward improving the management of wildland fires. Areas recommended for review included, but were not limited to: COHDEFOR's policies, commitment, staffing, technical capability, equipment, organization, and coordination with other agencies in Honduras. In order to gain a broad understanding of the existing problems, and develop useful recommendations, a comprehensive trip covering many of the fire problem areas of the country was conducted.

As an initial step, a team of four fire suppression specialists, from the Department of the Interior provided an in-country, on-the-ground suppression and equipment training in three Honduran Management Units (La Union, Salama, and Campamento) in the Olancho Region. This provided COHDEFOR fire management personnel and Brigades (Honduran Fire Crews) with current state-of-the-art, hands-on training in suppression, organization, fire tactics and strategy, fire behavior, safety, and fire equipment maintenance practiced in the United States.



## ANALYSIS OF GENERAL AND SPECIFIC MEASURES

### Management Organization

The present COHDEFOR organizational structure is based on a normal line/staff structure. At the top of the line is the General Manager of COHDEFOR. This position reports to a Board of Directors. Below the General Manager are Regional Chiefs and Administrative Departments at the National Office. There are nine Regions. These Regions are physically located in the field with the exception of the Francisco Morazan Region, which is co-located with the National Office in Tegucigalpa. These Regions are: Francisco Morazan, Olancho, El Pariso, La Mosquitia, Yoro, Comayagua, Copan, Nor-Occidente, and Zona Sur. Each Regional Chief is supported by a staff organization comparable in responsibilities and titles to the National Office.

The next and final Line Office is the Management Unit, which is managed by a Unit Chief who is supported by a staff based on workload and Unit priorities. It is at this management level that all the on-the-ground fire management functions are executed. Management Units have established Fire Brigades, Lookout Towers, and Vigilantes (patrolmen) based on historical staffing levels and budgetary constraints. (The total number of COHDEFOR Fire Brigades is 48, which is about half of the number existing 2-3 years ago. This reduction was due to budgetary constraints, not work load.)

A major deviation from the Line/Staff organization has been created with the establishment of a special project funded by U.S. AID, called the Forestry Development Project (PDF). The PDF is managed by a Project Manager, Danilo Escoto, who reports directly to the General Manager of COHDEFOR. Two of the Olancho Region Management Units (Salama and La Union) are in PDF and report directly to the Project Manager, bypassing the Regional Director for the Olancho Region. The PDF is well funded (3.5 million Lempira) and directly and indirectly supports the fire program in many areas, such as equipment, vehicles, etc. There is a wide range of variance among the incumbents of all levels of the fire program in the prerequisite skills necessary to perform the normal functions and activities of providing leadership and direction to a fire management program.

### Findings

We found that the current staffing levels for the fire protection organization are inadequate to meet the immediate and future needs within COHDEFOR. One problem is the lack of tenure in positions within the protection organization. Several of the people who have Regional or Management Unit Protection responsibilities are new (less than six months) in their positions. The incumbents had varying levels of experience, education, and background. Initiatives and programs started by one individual are not seen



through to completion due to a lack of program continuity. Incumbents in the existing protection positions are being reassigned within COHDEFOR or being hired by private industry. For example, commercial timber operators are able to offer higher salaries and benefits packages.

Several institutional constraints exist which restrict COHDEFOR's ability to implement a credible fire management and suppression program. These limitations fall in the general areas of personnel management, organizational structure, and financial management systems.

### Recommendations

If the wildland fire suppression function is to remain within COHDEFOR (as opposed to the establishment of a separate and distinct Honduran fire organization), and it is expected to function at a professional standard, there are critical organizational adjustments to be made. Below are our recommendations for each level of management.

#### 1. National Office

Have the Chief of Protection report directly to the General Manager.

Abolish the Social Forest Development and the Communications/Publications Units. These units appear to have an unclear functional mission with minimal output.

Establish three new units: Fire Planning and Budget, Prevention, and Fuels Management. Staffing of these new units would be three permanent full time professional employees. General duties for these positions are addressed in other portions of this report.

#### 2. Regional Offices

Each Regional Office should have a comparable organization structure and staffing based on that individual Region's fire workload.

#### 3. Management Units

Management Units with a high fire workload should have a permanent full time professional Chief of Protection and Chief of Fire Management. Each Unit should also have a dedicated staff for vehicle and equipment maintenance. Low fire workload Units could



most likely suffice with only the Chief of Protection position.

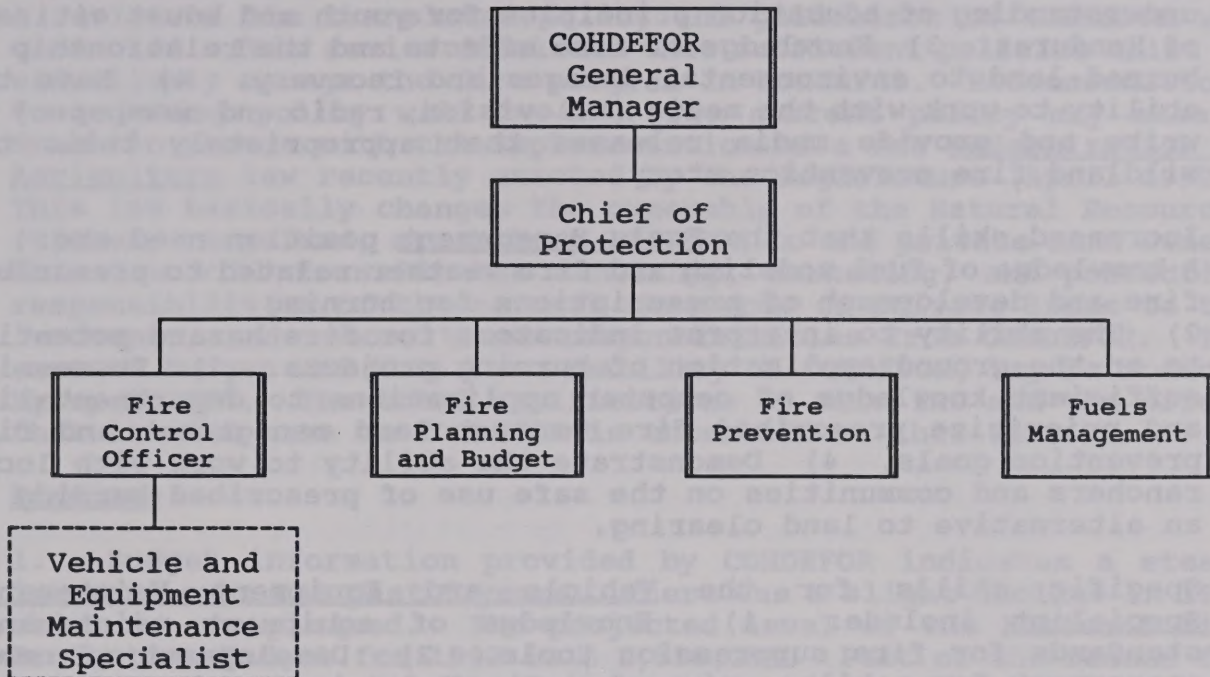
#### 4. All Offices

COHDEFOR needs to establish a career ladder within the fire organization that would set minimum education, training, and experience requirements for the various fire positions and provide for a progressive movement of personnel through the organizational structure.

The following organizational chart provides our recommendation on how these positions will fit into the overall organization.



National COHDEFOR Fire  
Office Organization  
PROPOSAL



This organization may need to be duplicated in both Regional Offices and Management Units. The actual work load would dictate specific needs. The other critical consideration would be the addition of a Vehicle and Equipment Maintenance Specialist at the unit level.

We have included position requirements for recruitment to fill these positions. All of the incumbents need to possess the following general skills: 1) Have graduated from ESNACIFOR in Forestry or a related curriculum. 2) Have a minimum of three years' field experience in fire or related programs. 3) Have a working knowledge of wildland fire behavior as it relates to fire spread and control of fires. 4) Have an understanding of local issues and problems with fire. 5) Have basic computer skills. 6) Be able to minimally read, speak and understand English as a second language.

Specific skills for the Fire Planning and Budget Position include: 1) A working knowledge of computer applications in the use of spread sheets and data tables. 2) A sufficient mathematics background to apply data to workable alternatives in budget and economic analysis. 3) A working knowledge of fire effects as it relates to the ecosystem, post fire recovery and application of



alternatives for suppression action.

Skills for the Fire Prevention position include: 1) Fluency in written and verbal English and Spanish so work between the United States and COHDEFOR can be carried out to the fullest. 2) An understanding of education principles for youth and adult citizens of Honduras. 3) Knowledge of fire effects and the relationship of burned land to environmental damages and recovery. 4) Have the ability to work with the media (television, radio and newspaper) to write and provide media releases that appropriately tells the wildland fire prevention story.

Increased skills that the Fuels Management position need are: 1) A knowledge of fuel modeling and fire weather related to prescribed fire and development of prescriptions for burning. 2) The ability to interpret indicators for fire hazard potential to on-the-ground application of burning projects. 3) Possession sufficient knowledge of computer applications to departmentalize and prioritize prescribed fire to meet land management and fire prevention goals. 4) Demonstrate the ability to work with local ranchers and communities on the safe use of prescribed burning as an alternative to land clearing.

Specific skills for the Vehicle and Equipment Maintenance Specialist include: 1) Knowledge of equipment maintenance standards for fire suppression tools. 2) Development of needs assessment for mobile equipment. 3) Understand maintenance and rotational schedules to replace obsolete trucks. 4) A working knowledge of computer applications for cataloging and maintaining records of mobile fire equipment and fire suppression tools.



## Policy and Budget

A review of the translated policy and guidelines of COHDEFOR was conducted. This review discloses that sufficient policies exist to effectively manage the fire program in Honduras. Recommendations to existing policy will be few. The current policy may make a dramatic change with the implementation of a new Modernization of Agriculture law recently enacted by the legislature (April 1992). This law basically changes the ownership of the Natural Resources (timber, rangeland, etc.) from COHDEFOR to the private land owner. This law will transfer the ownership, marketing, and protection responsibilities of the natural resources on private lands to the landowner, and remove these responsibilities from COHDEFOR. The current budget and thus the capability of COHDEFOR, may be reduced by up to 50%. The total ramifications of this law and the effect that it will have on COHDEFOR is uncertain at this time.

## Findings

1. Budget information provided by COHDEFOR indicates a steady increase over the past 5 years. There was a slight decline in 1989 which is unexplained. The projected level of the National Fire Protection Budget for 1992 is L 1,550,291. Part of the reason for this increase may be attributed to the higher minimum wage base salary in the country. This may be difficult to equate to previous budgets since a change in the minimum wage has increased costs from L 280 to L 370 per month. Financial reference used in this report is based on the local currency, the Lempira. Current exchange: \$1.00 U.S. = L 5.40.

2. We were unable to obtain a total budget or allocation figure for fire protection in the country. The figure quoted above constitutes only the allocation provided to the National and Regional Offices, not Management Units. The total expenditures for fire protection for the country were not available.

3. There is a lack of implementation and enforcement of existing policies.

## Recommendations

1. COHDEFOR needs to insure that existing policy continues to meet the needs of the protection organization. The General Manager of COHDEFOR and the Chief of Fire Protection need to hold Regions and Units responsible and accountable for the direction within their manual. This is currently not being done.



2. The budget allocation process is not working. The Chief of Fire Protection has little or no input into expenditures or allocations at any level for the fire program. We feel that if the responsibility for fire protection lies with this position it is critical that the incumbent play a major role in the budget process.



## **Planning**

The planning and budgetary process for the following fiscal year (January 1-December 31) generally begins in June of the current year. It is done without a great deal of lead time on the request for input from the Management Units to the Regions to Tegucigalpa.

## **Findings**

There appears to be little thought given to the budget until the formal request for input is received, then the budget, for the most part, is a carbon copy of the previous year's. No organized approach is taken for long term planning. There is no existing mechanism to provide budget input for replacement of vehicular equipment or hand tools. If anticipated and requested from the Regional areas, the Tegucigalpa Budget Office tends to cut replacement or added equipment items because there are insufficient funds.

No mechanism exists for movement of personnel from one Region to another or between Management Units within the same Region should extreme burning conditions or other occurrence problems exist.

There are no plans existing that will aid management in making decisions based on Land or Resource Values. There are no land management plans other than those in PDF that tie economic or any other criteria into a system that aids in the allocation of funds, priorities, or resources.

## **Recommendations**

1. Establish a Fire Planning position within the COHDEFOR Fire Protection organization. The incumbent will be responsible for planning guidelines and providing leadership in a long term planning effort that will include all aspects of fire management for Honduras. Expansion of the organization and increased funding should be dependent on a completed fire management plan.
2. Identify and carry out a fire planning process that will provide a basis for COHDEFOR to develop budget strategies and implementation.
3. Fire Protection personnel should be given the authority and responsibility, and be held accountable, for the activities with the fire plans and budget.
4. Fuels management (prescribed burning) should be expanded in the country to lower the fuel load as a fire prevention measure. Funding of prescribed fire must be tied with the accountability for accomplishment of prescribed burning goals.



5. Conduct an analysis to determine the number of Fire Brigades required and locations for these Brigades based on a five year average fire occurrence. Consideration should be given not only to the fires that have been fought but also those that should have been given adequate resources.

6. Conduct an in-depth evaluation of the "Vigilante" program in terms of its cost effectiveness. Give serious consideration to the expansion of the community-based program being initiated at La Union.



## Statistics

While numerous fire statistics may be found identifying the number of fires and areas burned, the accuracy of these figures is questionable.

Year	No. Fires	Hectares Burned
1986	2,795	67,647
1987	2,398	139,704
1988	1,675	53,853
1989	2,204	41,361
1990	1,650	17,650
1991	2,618	64,568

An example of this inaccuracy in fire statistics can be noted in 1991, which was an extremely active fire year. The best estimates of the actual area burned is over 1,000,000 hectares, opposed to the 64,568 hectares reported. Several COHDEFOR fire management personnel have told us that over 60% of the coniferous forest burned. Fire statistical data is only as good as the detection and reporting program.

## Findings

1. The common practice in all Management Units is to make written reports only on fires that are actually suppressed. This is a minor portion of the number of actual fires occurring in the country.
2. A year end report does attempt to capture all fires, but the report relies on lookout and vigilante individual logs and recollections, and must be considered highly incomplete in terms of number of fires and area (size and location) burned.
3. Detection of fires occurs mostly from road travelers, lookouts, and vigilantes. Lookout observations are extremely limited when numerous fires restrict visibility.

## Recommendations

1. Develop a standard fire reporting policy that requires a formal statistical report and fire perimeter map for all fires burning in wildland fuels. This policy must be very specific on the details of what and how to report.
2. Develop a record of the fire data at the Regional Office. Burned area maps should be completed (overlays probably most practical) at each Regional Office and consolidated at the National Office into an annual data base.



3. Explore several different areas that will improve fire detection.
4. Consider the use of satellite imagery to confirm annual burned area for statistical purposes.

1997	5,192	64,228
1998	1,675	22,883
1999	2,804	41,351
2000	1,820	17,850
2001	2,818	64,228

An example of this discrepancy in fire statistics can be noted in 1991, which was an extremely active fire year. The best estimates of the actual area burned is over 1,000,000 hectares, compared to the 64,228 hectares reported. Several CHURCH fire management personnel have told us that over 50% of the coniferous forest burned. Fire statistical data is only as good as the detection and reporting program.

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## Fire Prevention

One of the most positive fire prevention measures in Honduras appears to be at the special Project PDF area in La Union. They have several active agreements there with local municipalities for fire prevention and suppression work. Communities that have no major fires are rewarded with the construction of a new water system, a community center, schools, etc., as an incentive to reduce fires and the loss of acreage to fires when they start. Other Regions have similar community involvement programs in some form or another.

There are a number of initiatives under way to reduce fires in Honduras. This includes those by the United States, other countries, and commercial enterprises that are providing prevention assistance to Honduras. CARE, an affiliate of the United Nations is one example of a good but independent effort in fire prevention. They have developed a fire prevention campaign in Honduras for the 1992 fire season. COHDEFOR has worked some with CARE on this campaign but for the most part, CARE and its contractor have developed the campaign.

The only problem appears to be a lack of coordination among all agencies that are attempting to assist in fire prevention or environmental issues. Many of the United States agencies in the country are meeting independently from COHDEFOR on a monthly basis to discuss overall environmental issues, including fire problems in Honduras.

COHDEFOR is in the process of establishing a youth participation campaign designed to involve young people in the country in fire prevention. There has been no measure of success for this program. They offer baseball caps depicting a COHDEFOR logo (a rabbit) as an incentive for their membership.

## Findings

Laws and regulations against starting fires without a permit exist in the country; however, enforcement of these laws are lacking. COHDEFOR has no enforcement authority. Enforcement is a police responsibility. COHDEFOR employees are reluctant to notify the police for known violations of fire laws for fear of retaliation.

Without any enforcement of the existing laws, a cultural and educational change is the only way to effect a change in the random fire starts. Changes will only be effective over the long term. It is doubtful that in the short term any significant reduction in fires will occur. It is well worth the long term fire loss reduction to enter into a fire prevention program.



## Recommendations

1. Develop and staff a Fire Prevention Specialist position in the COHDEFOR Fire Protection organization that will be responsible for the leadership and coordination of a fire prevention education program for the reduction of wildfires in Honduras.
2. Develop a fire prevention campaign that emphasizes the wise use of fire rather than the total elimination of fire in the wildland areas.
3. COHDEFOR must include fire prevention in the overall fire planning effort that needs to be accomplished. Prevention planning will identify the Regional or Unit level need for Fire Prevention Specialists and programs.
4. COHDEFOR, the Police, and the judicial system need to work together to determine a non-monetary judgement that could be used as a deterrent to the willful starting of unauthorized fires.



## Fire Suppression

The key to a successful fire suppression program in Honduras is initial attack. Fires have a low resistance to control; almost all fires that are detected early (15-60 minutes) can be successfully controlled with modest levels of commitment.

The only credible suppression forces that exist in Honduras are the Fire Brigades in the Management Units. The Brigades are composed of six to twelve firefighters and a crew boss. They are composed of combinations of personnel from COHDEFOR, the military, and the timber industry. Brigade size, structure, and type varies with individual Regions and Management Units. For the most part, the personnel in the Brigades are highly motivated and are very physically fit for the job.

## Findings

There is no standard operating procedure for the size of the fire protection organizational structure, and minimum training. Training should include basic elements of small unit tactics, strategy, command, control, and leadership. One of the biggest problems is inadequate transportation, tools and radio communication between the Brigade and the dispatch center, and intra-Brigade communications. Each Brigade is normally equipped with one vehicle (pickup), one mobile radio and some handtools. Tool quantity, quality, and mix varies significantly among Units. Pine boughs are routinely used as swatters. The critical requirement of providing these firefighters with adequate tools and equipment necessary to perform the mission assigned to them cannot be over emphasized. Military Fire Brigades provide their own transportation but rely on COHDEFOR for their tools. Industrial Brigades vary on equipment provided by their employer and COHDEFOR. The COHDEFOR Brigades are normally composed of one to three permanent employees, the balance are seasonal employees. Permanent employees are provided with a uniform consisting of boots, long sleeve khaki shirt, and cotton trousers. Temporary employees are not provided with any personal gear. The Brigades are supplemented by Vigilantes (patrolmen) and local villages hire on a "food for work" or community agreement basis.

There appears to be little involvement from Unit Fire Protection Chiefs in the day-to-day fire decisions, i.e., which fires to suppress, priority setting, prepositioning, or scheduling of crews. These decisions are normally left up to the crew boss. Fortunately, most of the crew bosses are well experienced and through personal knowledge usually make the appropriate decisions. All fires observed being fought were close to a road. Fires off the road did not appear to be of any great concern and no action was taken. Discussions with local personnel also confirmed this observation. Given the very limited number of suppression personnel available, this situation is to be expected.



A lack of planning for presuppression and suppression is very apparent. There is a tendency to deal with a situation or problem only when it arises. There is no intra-, or inter-Regional movement of Brigades or other resources on a presuppression or suppression assistance basis. What a Management Unit has, or can gather up within its Unit, is all it has.

There is no system available to efficiently and consistently gather weather data on a daily basis nor to be able to have predicted weather that would alert field fire personnel of weather conditions that would be potentially critical during any period. There is no standard of converting fire weather data into a single Fire Danger Rating System as an aid in decisions for prescribed burning or staffing for fire brigades. COHDEFOR currently uses two fire danger rating systems, the Alvarado System developed in Honduras and the Canadian System. There appears to be no attempt to standardize on one system over another; field units are left to make their own decision on a fire danger rating system, if any. Weather observations and predictions are the major variable component in the ability to interpret potential behavior of fires and possible safety of the fire personnel in Honduras.

Suppression tactics appear to be sound. Brigades normally beat out the fire perimeter, and do build handlines when the situation requires. They routinely mop up the perimeter and may follow up with inspections of fires the following day. We have heard statements that reburns are a problem but have no first-hand knowledge that this is true. Normal night humidity recovery is a significant factor affecting the reburn problem.

Training in small unit tactics is deficient. It is common for Brigades to split up on an every-man-for-himself basis on arriving at the fire. This results in the crew boss losing control of the tactics and inability to maximize the efficient use of available personnel. When Brigades split up, as appropriate, they should do so under an organized squad basis and have communication with the crew boss.

Tool maintenance, caching, and accountability are all inadequate. Most brigades lack even the most rudimentary equipment to maintain tools. Facilities for tool reconditioning, grinders, welders, and handle replacement, are non-existent in most Units.

Brigades are assigned one light to medium weight pickup truck which transports the Brigade and their tools. The drivers of these vehicles are considered safe drivers and with their driving techniques are considerate of those they are transporting.



## Recommendations

1. Assure each Brigade is equipped with adequate tools, and tool maintenance equipment. Assure that the appropriate annual budget planning provides for tool maintenance and replacement. Vehicle maintenance and replacement must also be accommodated in the budgetary process. This should be given priority status.
2. Develop a national standard for brigade size and configuration: crew boss, two squad bosses, and twelve firefighters appears to be an appropriate configuration. This should be evaluated and an exact configuration determined by policy.
3. Assign two vehicles, equipped with roll bars and tool boxes to each brigade. Some of the Units are working on this, but we feel that this should be a standard with direction and assistance provided by the National Office. First Aid equipment, training, and emergency medical evacuation systems are not provided.
4. Provide personal protective equipment consisting of boots, fire resistant cotton shirts and trousers, gloves, canteens, and hardhats to all Brigade members.
5. Develop minimum training and experience standards for crew bosses, squad bosses, and firefighters. Training should include fire tactics, suppression skills, first aid, fire behavior, fireline safety, tactics and strategy, leadership skills and defensive driving.
6. Develop a system for daily compilation of on-the ground weather observations. An agreement with the National Honduran Weather Service needs to be developed to provide daily predictive forecasts to the field. COHDEFOR needs to agree and implement one fire danger rating system that can be applied throughout Honduras to provide daily predictions on the potential for wildfire and prescribed burning.
7. Establish and maintain annual fire training workshops for all Brigade (crew bosses) supervisors. This should be a national level session.
8. Pre-fire season fire readiness inspections of all Regions and selected Management Units should be conducted. This should start at the National level and move to Unit levels within the organizational structure.
9. Conduct post-season reviews at all management levels. These reviews should be chaired by the respective organizational unit line officer.



## Fire Effects

Within Honduras, an estimated area of 18.3 million acres, approximately 65% of the country's land mass is forested land. The deciduous forests are primarily located in the northeastern and southeastern portion of the country. Pine forests cover approximately 7.4 million acres and are concentrated in the central and western sectors of the country. The principal species include Pitch Pine (*Pinus Oocarpa*), Caribbean Pine (*Pinus Caribaea*), and White Pine (*Pinus Pseudostrobus*). Oocarpa Pine covers the largest area and is the major source of coniferous timber.

## Findings

The country's forest reserves are declining rapidly. The area of pine forests has not declined to the degree that the deciduous forests have, but are being degraded significantly. One of the principal causes of this degradation is wildfire. Uncontrolled fires sweep through thousands of hectares of pine forest each year. Most are surface fires and do not seriously damage mature trees, but do destroy seedlings and young trees. Many of the local citizens residing in the pine forest areas do not perceive any direct advantage to proper forest management, and consequently use fire in an inappropriate manner. Fire is routinely utilized for land clearing, the removal of dead grass and brush. Many of these fires escape to the adjoining forest land. Cattle ranchers also set fires on their rangeland in order to improve the palatability of the grasses and to control insects.

The fires we observed were all low intensity surface fires with very limited crown involvement. The resistance to control is extremely low and tree mortality appears limited to reproduction under 5-10 feet in crown height. Crown scorching and occasional torching of small dense stands occur. The principle negative effect of these fires appears to be limited to short term incremental growth loss, mechanical damage, and perhaps an increased opportunity for secondary insect or disease infection.

We observed only limited soil erosion evidence; almost all existing gullies and arroyos were stabilized, with a good complement of brush and grass established on exposed surfaces. General surface erosion, especially when heavy rains occur shortly after the burn, are routinely mentioned and undoubtedly occur, especially in the more severely burned areas.

The observed low intensity fires in mature stands appear to produce little or no damage and often produce significant benefits, with reduction in fuel loading, removal of old grass/brush, range improvement, etc. The Honduran pine forest represents a fire climax condition whose continued existence is dependant upon the maintenance of frequent low intensity fires.



High intensity fires cause considerable damage not only in tree mortality and damage, but to the other related natural resources of watershed, air quality, soil fertility, soil erosion, etc.

No observation of active fires in the Caribbean Pine fuel type was made. We did look at a 1991 fire area that occurred near San Esteban in the Olancho Region that resulted in heavy mortality to the stand. This species appears to grow in much denser growth patterns and is more susceptible to fire damage and mortality because of crown fires in this fuel type.

### **Recommendations**

1. A definitive evaluation of the total fire effects in the principal pine fuel types is required to define, quantify and provide managers with the economic impact of forest fires. This evaluation, while emphasizing the effects on timber production and watershed impacts, should also address both positive and negative effects on the other resources. The emphasis of this analysis should be to quantify the economic impact of wildfires on the Honduran economy.



## Cooperation with Other Honduran Agencies

The military is currently the only formal cooperator that COHDEFOR uses in its fire management work. In the Nor Occidental Region, the National agreement has been expanded to include detection by the local Air Force Brigade and Army assistance is used on an as-needed basis for prevention and suppression work. The 1990 agreement appears to be working provided the Commanding Officer of the local military unit and the Region or Unit Managers with COHDEFOR have established working relations. Military assistance, for the most part, is not sought by COHDEFOR.

## Findings

One area that needs to be explored is cooperation with local fire departments. Tegucigalpa, San Pedro Sula, and other larger cities in Honduras have fire departments that are similar to those in the United States. Local fire departments have the staffing and suppression equipment, water, hose, tools, and pumps for delivery of water to deal with those fires that might be considered interface fires between the urban and wildland areas. Their assistance may be obtained to leave the city and provide work on wildland fires that occur near roads or within a reasonable proximity to the city.

This is prevalent in the Francisco Morazan Region and Tegucigalpa. Currently, if a fire burns in wildland fuels within the city, the local fire department takes no action and defers the problem to COHDEFOR. COHDEFOR may take action, but the attack on the wildfire within the city is made only with hand tools and no assistance is received from the municipality.

Two other areas have potential for cooperation. One is the National Emergency Disaster Committee (COPECO). This organization is equivalent to the United States Civil Defense. COPECO has limited equipment but could provide logistic support and some fire suppression through other agreements in the country. The other potential area of agreement is with the timber industry. Some Regions or Units are taking advantage of this resource but there is no National direction or guidance available to channel this effort.

## Recommendations

1. Develop an agreement with existing municipal fire departments for assistance on urban interface fires with potential expansion to rural areas of current COHDEFOR protection. Training opportunities may also be accomplished with local fire departments.



2. On a national basis, enter into an agreement with the Honduran Air Force that would utilize its assets for fire detection. (This is being done in the San Pedro Sula vicinity at the Regional level with a significant degree of success). The use of remote sensing should also be explored for detection. Fixed wing infra-red is most likely available locally from the Air Force and satellite imagery should also be looked into.

3. Provide direction and policy statements for guidelines necessary for formal agreements in Honduras. These should include the needs at the National, Regional and Unit levels.

4. Encourage the expansion of the National Military Agreement to local levels where military brigades could become more responsive to fire suppression detection and prevention work.

5. Develop agreements with other agencies that have a potential for assisting COHDEFOR to accomplish its mission in fire protection.



## Equipment

There are a limited number of hand tools for fire suppression throughout the Regions and Management Units visited. Many of the tools have been in service for a number of years and have been rehandled with local materials.

## Findings

Extensive use leaves tools with only limited service life remaining. There is no mechanism to replace the suppression tools used. Tools are used beyond the point of efficient, safe and effective serviceability.

One proactive step for replacement tools has been accomplished by Regional Chiefs and local manufacturers in Comayagua and the Nor Occidente Regions. Manufacturers are fabricating McLeods, Council Tools and Fire Swatters fashioned from tools used in the United States. The Honduran McLeod is made and sold for L 30 to L 40, including the handle. The same tool is sold in the United States for about \$60.00 (L 324 plus shipping).

Another major equipment problem that exists in Honduras is the vehicles for the transport of suppression personnel and equipment to accomplish fire suppression and project work in the various Regions/Units in the country. Vehicles used have been provided by grants or working projects from other countries. No guidelines exist for the replacement of these vehicles when their service life has expired.

Limited preventive maintenance on vehicles or hand tools exists. Equipment is used until it is no longer serviceable, then used for spare parts on other vehicles or discarded. There is no system of driver or personnel accountability for vehicular or other tools and equipment.

## Recommendations

1. Review the existing COHDEFOR policy requirements for maintenance, accountability, and repair of equipment.
2. COHDEFOR must develop a system of accountability and maintenance of tools and equipment used for fire protection. The use of in-country tools should be pursued to the maximum extent possible as an aid to local economy.



3. Conduct a country-wide inventory to determine the quantity and serviceability of the current tools and equipment. Develop priorities for the replacement of equipment in Honduras. This should also be addressed in the fire plan previously discussed.

4. Determine training and equipment maintenance requirements. Develop a preventive maintenance schedule as well as a mechanism whereby tools can be cached for extensive maintenance.



## Communications

While COHDEFOR does have a rudimentary radio communication system in place, this system is totally inadequate to meet the communication requirements of the fire organization. The current radio communications system was provided by a grant from the Canadian Government over ten years ago. There has been very limited care and maintenance of the system since it was installed.

## Findings

Every manager we met listed inadequate communications as one of the major on-going problems. This, coupled with the limited telephone system, short supply of vehicles, and distances between Units, results in the severe adverse restriction of essential communications required for the day to day management of the fire program. The ability to appropriately respond to an emergency situation is severely impacted by the existing communication system.

Fire Brigades normally have one mobile radio in their vehicle. They have no portable radios for on-scene use. Inter-squad communications for critical command and control direction or other emergency use is non-existent.

## Recommendations

1. Initial assistance by a United States Telecommunication Planning Specialist should be provided. This individual should be experienced in designing both mountain top backbone systems as well as fire communications. A detail of this nature would provide a strategic telecommunication plan specifying appropriate systems, both voice and data between all Management Units and their respective Regional Offices, and all Regional offices and the National Office.

In addition a frequency management plan should be developed.

2. Fire brigades should be equipped with two personal portable radios for inter-Brigade communications on fire.

3. COHDEFOR needs to establish an in-house capability or a contract with the private sector for the annual maintenance of all radio equipment. It may be possible to arrange an interagency agreement with the military for a portion of this requirement.

4. The use of solar panels and wind generators should be evaluated. Present communication systems use vehicle batteries for the principal power supply.



## Technical Capability

Personnel involved with fire management in COHDEFOR are technically capable and competent to accomplish their mission. Long term fire planning is required to establish the criteria for technical competence needed by COHDEFOR. The 1991 Law of Modernization and Development of the Agricultural Sector will further compound the problem since the COHDEFOR organization is in a state of flux until all ramifications of this new legislation can be determined.

## Findings

There are not enough personnel who are assigned protection responsibilities to carry out the mission of a fully functional Fire Management program under the current COHDEFOR organization. There are no personnel dedicated to fire prevention or fire planning.

Protection personnel have many different responsibilities that take away from fire management activities. Long term planning and follow up presuppression reviews and activities are non-existent.

## Recommendations

1. Develop a position at the National Office and perhaps at some Regional Units for fire prevention and planning. Coordination of the fire prevention effort in Honduras and initiating a mechanism for education of the people must be accomplished. This education process must have an emphasis on face-to-face and radio education in rural areas plus other media such as television and posters in the urban areas.

2. COHDEFOR needs to complete a plan for the fire protection organization that bases decisions on the resource values and the required level of fire protection.

The financial commitment is estimated at \$20,000. This includes the computer, software and approximately 30 days for the temporary operator.

4. Once COHDEFOR has completed a detailed inventory of tools and equipment assigned to Fire Protection and developed a system of replacement for all fire equipment in Honduras, the United States will agree to replace 50% of the hand tools and 50% of the vehicles. Hand tools that are replaced are estimated to be L 30 for McLeod, L 30 for Council Tools and L 20 for fire axes. Back Pack Pumps will be provided from the United States at an estimated cost of \$70.00 (L 375) and trucks at L 60,000.



## Commitment

Our observations, supported by discussions with numerous people with direct knowledge, indicate a history of numerous onetime assistance programs from a variety of sources, mostly international aid. They were established and implemented but were not institutionalized in terms of budget and organization for their continuance once the outside assistance was terminated. It is imperative that any assistance, monies, equipment, technical assistance, support, etc., be complemented by an appropriate commitment of support from COHDEFOR that will insure the long-term continuation and maintenance of the efforts and equipment provided.

## Findings

Numerous projects initiated by other countries in Honduras have been abandoned once the funding or sponsoring country leaves the area. This was evident in the projects started by the Canadians in 1979 and other projects instituted by Germany. There has been considerable investment done in the past but because of the lack of budgetary or personnel commitment there is little to show for these efforts.

## Recommendations

1. COHDEFOR must have an organizational structure in place that meets the components of the Action Plan (following) for outside assistance to be effective and long lasting.



## ACTION PLAN

1. The Bureau of Land Management is prepared to enter into a Participating Agency Service Agreement (PASA) with U.S. AID. Upon completion of the PASA and recruitment of a Project Coordinator, we could have the incumbent in place by December 1992 until the end of the present Project 12/31/94. The purpose of this position would be to interface with its counterparts in COHDEFOR and the U.S. AID Project Lead in the continued evaluations of the recommendations submitted. Cost for this assignment is approximately \$300,000.

The Project Coordinator must have an extensive background in overall fire management, including current fire suppression and prevention, possess knowledge of fire planning and the budget relationship, be knowledgeable of fire equipment programs, and have the capability of speaking and reading Spanish.

2. Once the COHDEFOR Fire Prevention Specialist position has been established and is in place, the BLM will provide Technical Assistance in Fire Prevention in Honduras to assist COHDEFOR in the development and implementation of a National Fire Prevention program; including the coordination with other Honduran and United States agencies. The incumbent must have an extensive background and current working knowledge of fire prevention and fire prevention planning.

We anticipate this as a temporary technical assistance program for the duration of one month. Cost is estimated at \$10,000.

3. Assistance in the area of statistics and fire planning will consist of the detail of one short-term technical specialist in fire statistical reporting, storage, and uses of data, and the purchase of an appropriate computer and associated hardware and software to accomplish this mission. COHDEFOR's commitment should be the establishment of a permanent position on the National Fire staff for the development and on-going operation and maintenance of the statistical data base and the fire planning that is needed in the country.

The financial commitment is estimated at \$20,000. This includes the computer, software and approximately 30 days for the temporary detailer.

4. Once COHDEFOR has completed a detailed inventory of tools and equipment assigned to Fire Protection and developed a system of replacement for all fire equipment in Honduras, the United States will agree to replace 50% of the hand tools and 50% of the vehicles. Hand tools that are replaced are estimated to be L 30 for McLeods, L 30 for Council Tools and L 30 for fire swatters. Back Pack Pumps will be provided from the United States at an estimated cost of \$70.00 (L 378) and trucks at L 60,000.



A Technical Specialist with experience, knowledge and background in fire equipment inventory, accountability and maintenance standards will be detailed to Honduras to refine the local equipment, maintenance and repair standards. Estimated cost is approximately \$40,000.

5. A Technical Communications Specialist will make a survey of two-way communications need in Honduras, including mountain top repeaters, base stations and mobile radios. Based on the survey, the United States could provide communications equipment to meet inventoried needs. The estimated time to accomplish the inventory and equipment needs is one month, for a cost of \$10,000.

6. A Fire Training Specialist will be provided by the United States who has expertise in qualification systems and implementation of fire training courses from the basics to the intermediate levels of fire training. The incumbent will assist COHDEFOR in the development of qualification standards and training packages that will be used to train Crew Supervisors, squad bosses and firefighters. Estimated time to complete will be one month, for a cost of \$10,000.

7. The opportunity for several experienced Honduran fire personnel to visit the U.S. for on-the-job training and experience in our Hot Shot and Fire Suppression Specialist programs will be provided. This should be limited to five to eight individuals. The COHDEFOR employees should be permanent with a minimum of five years experience each and have the desire and ability to train others. The goal of this effort would be for these individuals to return to Honduras and be responsible for establishing and executing similar training for all Brigades in the system. The cost for this, based on eight people, including travel and subsistence in the United States is \$10,000 per person per month or \$80,000.

8. COHDEFOR should conduct a study and economic analysis of the Fire Protection program. Assistance in the areas of temporary assignment of fire effects and/or economic specialists could be made. Estimated time to complete will be one month at a cost of \$10,000.

9. U.S. assistance in this area should consist of the detail of one technical expert in fire statistical reporting, data storage, and utilization, as well as the purchase of appropriate ADP hardware and software to accomplish this requirement. COHDEFOR's commitment should be the establishment of a position on the National fire staff for the development and on-going operation and maintenance of the fire statistical data base.



10. Once a weather observation and a fire danger rating system are designed, the United States will provide assistance in the procurement of weather instruments. We will be able to offer training in the implementation of the plan to document weather observations and conversion to the adopted fire danger rating system. The time for this assistance is 1/2 month and the equipment purchase estimate of \$500 per Weather Observation Station is \$5,000.

<u>POSITION</u>	<u>DURATION</u>	<u>COST/ MONTH</u>	<u>EQUIPMENT COST</u>	<u>TOTAL</u>
Fire Management Specialist	25 months	\$12,000		\$300,000
Prevention Specialist	1 month	10,000	\$ 3,000	13,000
Planning Specialist	1 month	10,000	10,000	20,000
Equipment Specialist	1 month	10,000	430,000	440,000
Communication Specialist	1 month	10,000	500,000	510,000
Training Specialist	1 month	10,000		10,000
Honduran Training in the United States	1 month	80,000		80,000
Fire Effects/Planner	1 month	10,000		10,000
Fire Statistics	1 month	10,000	4,000	14,000
Weather/Fire Danger Rating Specialist	1/2 month	<u>5,000</u>	<u>5,000</u>	<u>10,000</u>
Totals		\$162,000	\$952,000	\$1,119,000

The projected timing of the United States Specialists involvement for implementation of the Action Plan is consolidated below for the review. This commitment must be considered tentative until the required action by COHDEFOR takes place.

Project Coordinator	January 1993
Fire Prevention Specialist	3 weeks in February 1993. 1 week in June 1993 for a followup assessment.
Fire Planning Specialist	2 weeks in June 1993, 2 weeks followup in November 1993.
Equipment/Inventory Specialist	2 weeks in January 1994, 2



weeks in May 1994 for followup.

Technical Communication Specialist 2 weeks in May 1993 for original planning and equipment recommendation. Two to three weeks in November 1993 for installation and testing.

Training Specialist 2 weeks in September 1993 for initial planning. Two additional weeks in January 1994 for followup and implementation.

Honduran trip to the United States Middle May 1993 to middle June 1993.

Fire Effects Specialist 2 weeks in April 1993 with a two week followup in November 1993.

Fire Statistics Specialist 2 weeks in January 1994 with a followup analysis for 2 weeks in June 1994.

Weather/Fire Danger Rating Specialist 1 week in November 1994 with another week for training and follow up prior to fire season in January 1995.



HONDURAS FIRE MANAGEMENT  
TRIP LOG  
MARCH 15-MARCH 28, 1992  
APRIL 19-MAY 2, 1992

March 15, 1992 Arrived in Tegucigalpa, Honduras, for the first two-week segment of the follow-up fire management assessment of the Honduras Fire Program.

March 16, 1992 Met with the United States Agency for International Development (U.S. AID), Jack Jordon, Project Leader, and Ramon Alvarez, Assistant. This meeting was to discuss general guidelines for our time in country and to firm decisions on the status of the Department of the Interior Training Team's trip April 4-May 10, 1992.

Significant areas of the Honduran fire problem were discussed as potential study areas. These included firewood gathering and cutting as a significant component of the deforestation problem, soil erosion, fire fighting; technical capacity, and how to best assure that COHDEFOR will be responsible and take the initiative to become self sufficient.

We met at COHDEFOR for a general discussion of two special Management Units within Olancho Region. These are the areas where the training team will be assigned. Danilo Escoto is the Project Leader and reports directly to the General Manager of COHDEFOR. These Management Units are primarily supported through US AID funds for the purpose of providing a demonstration area for the rest of the country.

March 17, 1992 Worked in the COHDEFOR Office in Tegucigalpa reviewing the organizational structure and general management of the fire protection program in COHDEFOR.

Talked with Peter Bauer, who is working on the PDF project for U.S. AID. Peter has a considerable amount of experience in Central America and in Honduras. He offered his thoughts to the COHDEFOR and fire protection organization.

Basically, he feels there is no clear fire



policy or planning guidelines within COHDEFOR. There is a lack of fire suppression resources. This problem will become more intense with the enactment of the Law of Modernization and Development of the Agricultural Sector. COHDEFOR will probably lose 50% of its funding with the implementation of this law providing the land owner with ownership of the timber resource. Government will now have to make up the difference in funding lost revenues that they previously received from forest product sales.

March 18, 1992

Met with Regional Fire Management Officer Conrrado Carranza at his headquarters in the Francisco Morazan Region. He does not feel that he gets appropriate support from the National Office in an adequate push to the national level for funding, legislation, etc. There has been no regional planning to determine the value of the resource versus the cost of fire suppression/presuppression. Some planning has been initiated but to date none has been completed.

The Francisco Morazan Region contains 700,000 hectares, 200,000 of which are in intensive watershed protection zones. The Talamga Unit within the Region has its priority in grazing. The normal fire season period for the Region is January 15 to June 15. During those periods, the following resources are staffed: Four lookouts and five crews (brigades) in the Central area (around Tegucigalpa). These are mixed crews composed of COHDEFOR employees, watershed people and military personnel. Two crews cover the remaining portion of the Region. Fifty other crews (casual employees) with minimum training are available for suppression. These crews are paid in food for time worked. Five COHDEFOR vehicles, two vehicles from the water company and two from the military, are available.

We also visited a project in Zambrano which is funded by Germany. The project encompasses 5000 hectares. Three thousand hectares of this area have been inventoried. The land was donated to COHDEFOR for a démonstration area. Funding provided by Germany is L 7.8 million which pays for 85 to 90% of the project. The remaining funding comes from COHDEFOR. The



project area plan is near completion with the primary objective to be multiple use management.

March 19, 1992

Visited the El Pariso Region where there are six Management Units, three lookouts (two within Danli Unit), six Foresters, five Brigades (COHDEFOR), two industry Brigades and 11 groups who are fire fighters (eight people) who work for food. The food-for-work incentive appears to be commonly used in Honduras. The payment includes: Corn, 4.4 pounds, beans 0.55 pounds, beef 0.33 pounds, and cooking oil 0.165 pounds. This is paid for a normal fire suppression day. They have three military battalions and the police are trained for suppression but they must request military assistance. The military will provide two vehicles but have no tools for suppression.

The fire protection budget for the El Pariso Region is L 65,700. The Region contains 138,370 hectares of protection, 81,300 hectares under an intensive response and 77,100 hectares in extensive protection. Basically, extensive protection receives no suppression action and fires are not counted as a part of the statistics. Agricultural burning is the chief cause of fires. Prevention and prescribed fire are major priorities for local management. Radio communications are a major problem in the dispatch of crews to fires. Repeaters are not working and the entire system, donated by Canada, is over 10 years old with little maintenance accomplished on the system. The purchase of basic firefighting tools is a special budget event, not something that is routinely planned for.

The visit included a trip to the San Jolian lookout tower. Enroute to the lookout, we drove through a fire that was staffed by a brigade. The crew left the fire once it was contained but not out, mopped up, or lined. This is common practice in Honduras.

March 20, 1992

A local flight in a military plane provided an overview of the local watershed, the urban interface, and potential fire problems around Tegucigalpa.



Met with Mike Godfrey, United Nations CARE, and Ray Dade (environmental contractor). CARE has donated \$25,000 for a fire prevention campaign. The effort is being coordinated and assistance is being provided by COHDEFOR. The campaign will start 4/4/92 and run for six weeks. Media involvement will include TV spots (donated time), radio spots (paid) and full page newspaper ads. The newspaper spots will be in the Saturday editions of National newspapers. Mike indicated a strong level of support from his organization with good potential for a continuing campaign beyond 1992.

March 23, 1992

Traveled to Campamento and Salama Units in the Olancho Region. At Campamento we met with Unit Manager Armando Discula and his Protection Chief, Armando Riviera. The Unit contains 5,000 hectares intensive management and 20,000 hectares extensive area of protection, one lookout (saw about 1/3 of unit), one car, one brigade and about 60 people available who work for food, three full time COHDEFOR personnel, and 10 temporaries. Private logging industry pays and assigns five people to work with COHDEFOR crews for the fire season. They also agree to fight fires within active sale areas. Sixty percent of the unit burned in 1991, damaging 30% of the timber. Main concern in the Units is erosion and timber loss.

The Salama Unit contains 93,000 hectares, 15,000 hectares in intensive management. Timber and watershed are major criteria for intensive areas. The fire protection strength includes two brigades and 10 foot patrols (vigilantes) working on community involvement for fire prevention.

March 24, 1992

Met with Daniel Serrna, La Union Unit of the Olancho Region. The Unit contains 100,000 hectares, 11,000 hectares in intensive care and 35,000 hectares under an extensive area of protection. There are three COHDEFOR Brigades. One brigade is a 15-person patrol paid by industry.

They are working in local communities and have 10 existing agreements with local communities.



In these agreements, the community agrees to provide fire prevention/protection and, in turn, COHDEFOR builds water systems, schools, etc. This incentive program appears to be working and they have a reduction of fires over last year.

March 25, 1992

Drove to the San Esteban Unit, Olancho Region. This Unit's timber is predominantly Caribbean Pine. Some of the plantations were burned last year with a heavy mortality.

This Unit houses their Brigades in field camps. We visited two of the COHDEFOR camps, Morazan and Cangelas. Both appear more than adequate to meet the needs. There had not been a great deal of fire activity, but the brigades were actively involved in prescribed underburning of plantations. They started these burns in the late afternoon and worked into the night to take advantage of the humidity recovery.

Returned to Tegucigalpa.

March 26, 1992

Worked in the COHDEFOR office in Tegucigalpa gathering facts and additional material. Met with Leonel Guillen, second in command for COHDEFOR. Discussed law that will affect ownership of land to the private sector versus COHDEFOR. Generally, this will make the private landowner responsible for the land and the resource contained on the land, and will provide landowner incentives.

COHDEFOR will not be responsible for protection or suppression of private lands. The new role for COHDEFOR will be in public education and fire training to the private sector and industry lands.

March 27, 1992

Met with Jack Jordan, U.S. AID. We discussed the probability of BLM entering into a direct agreement with U.S. AID. A Participating Agency Service Agreement (PASA) will have to be developed based on U.S. AID's ability to meet its requirements. In addition to the Bureau's participation, private industry must also be considered as an alternative to the completion of the goals set for the project with Honduras. The long-term private work could be for timber management, forest



management and logging engineering. Jack appeared to be pleased with our progress and assessment to date.

March 28, 1992

Returned to the United States.

April 19, 1992

Departed the United States for Tegucigalpa, Honduras, for the second two-week segment.

April 20, 1992

We met at the Hotel San Martin with Jason Bleibtreu, Worldwide Television News, regarding a schedule that he and Jennifer Callan, BLM, Public Affairs, Washington, D.C., had agreed to for the filming of the Department of the Interior (DOI) training team in action in Honduras. Jennifer had asked us to make the contact and assist where possible in the contracted filming. The only significant problem with the filming was the failure to contact the U.S. Embassy and advise them of the BLM plans to make an in-house documentary.

We participated in a short meeting with Ramon Alvarez, U.S. AID, on general activities in the country since our March departure. He updated us on the fire statistics and the work being done by the DOI Training Team. Current fire statistics are: 700 fires in Honduras, 80% of the total area burned is intensive units. The total number of fires in 1991 was about 1000.

We met with Terry Kneebone, U.S. Embassy, PAO. He discussed the opportunity to provide credit for the efforts of the United States by filming some of the training team in action. His product is to be used by the United States in the local media. He requested an itinerary where shots can be made for local media. We countered suggesting the possibility of using WTN footage. This was discussed with Jennifer Callan on the telephone, and she was happy to cooperate.

We proceeded to Campamento to meet with Jesus Robles, one of the DOI Training Team members. He has been on four fires since his assignment. Most of the fires in the area have been within 1/4 mile of a road in young regeneration areas. It appears the major cause of the fires is agricultural burning.



Campamento provides 16 people in a Brigade, but to provide seven day coverage there is an average of 10 daily. When on fires, minimum line construction is done in Campamento and some mop up is done. No night work has been done on fires, but all fires have been suppressed by 1700 hours. They need to do major work on hand tools. A file is not adequate because of the condition of the tools; they need a grinder.

One of the major problems Jesus has detected is that COHDEFOR has no National Standard for Crew Boss training. It appears the local Crew Boss picks up knowledge from local experience. The crews appear to do an acceptable job in fire size-up, but there is a lack of organizational structure on the fires.

We left Campamento and proceeded to Salama where Clyde Stonaker is based. Clyde and Jesus accompanied us to La Union where we met with the entire DOI Training Team to review findings and experiences.

April 21, 1992

Met with the DOI Training Team at the La Union Unit Headquarters. The purpose of the meeting was to discuss its preliminary findings and the results or problems, if any, they have had with their details. All team members are satisfied with the assignments and feel that they have developed a rapport with the assigned Brigades and other personnel at their stations. We agreed no change of location was needed but if minor changes of location were desired, Tony Beltran, Chief of Party, could work through COHDEFOR and accomplish the change.

The optimum crew size appears to be between 16 to 18 people on the Brigades. Safety equipment and training are the weakest points of the Brigade qualification. Boots are provided to the full-time COHDEFOR employees. Seasonal firefighters have no assigned uniform and wear everything from sandals to rubber boots.

The mid-size standard pick-up appears to be the best vehicle for Brigade use. COHDEFOR-assigned drivers appear to be good and careful, but the same cannot be said for the



Crew Bosses. There is a need to improve the safety of the mobile equipment, i.e., roll bars, seats, tool boxes, etc. Currently, the entire Brigade stands in the back of the pickup, with tools, while enroute to fires or project work.

No weather system or means to analyze the weather into a fire danger rating system is apparent in the country. Decisions on staffing or placement of the Brigades is based only on experience and/or desire of the Crew Boss. Radio communication is also a problem that dictates where the Brigade may be working. Frequently, once away from a main station, there is no communication because of radio obsolescence or failed batteries for operation. Solar power for battery chargers for fire lookouts and out stations without commercial power could be used.

An accountability system for tools and other fire equipment issued to the Brigades and personnel assigned to the Brigades is needed. Under the current system, tools tend to disappear over time. There is no one specifically responsible for vehicular equipment or hand tools.

They have the capability to provide crew level training in Honduras but do not have the budget to bring Brigade Leaders on early in the season to provide the training. All crews, including leadership, are brought on at the same time throughout the country. Training for COHDEFOR employees is often based on political desires rather than demonstrated needs.

April 22, 1992

Worked in COHDEFOR Office in Tegucigalpa on compilation of our findings and recommendations for the report.

April 23, 1992

Traveled from Tegucigalpa to San Pedro Sula via Comayagua and Siguatepeque.

In Comayagua, we visited P.M. Luis Rodolfo Terrari Paz at Industrial "Tadeo". This company manufactured McLeods and Council Tools for COHDEFOR in January 1992. They have manufactured 12 dozen each at L 40 for the



McLeod and L 30 for the Council Tool.

At Siguatepeque we visited the National School of Forestry Sciences (ESNACIFOR). We were provided a general curriculum overview and briefing by the school's Director, Adrian Magana Petit. The current enrollment is 140 students from Central America, the Caribbean and South America. Enrollment has increased to 140 from about 70 in 1990. The school is highly thought of in Honduras for the quality of the students graduating.

April 24, 1992

Toured the Nor-Occidente Region. This Region contains six Management Units. Domingo Pineda is the Management Unit Chief and Conrado Garcia is the Protection Chief. Both of these people show a great deal of drive and initiative in the management of their Region. The strength of force in the Region includes: eight COHDEFOR Brigades, eight Army Brigades, and one Brigade from the Air Force that can be added in an emergency. Fourteen Community groups have been developed for prevention/suppression work. Communities also cooperate with CARE for prevention and suppression. They often work on fires for food, but can also work for community development projects.

The Air Force has agreed to make detection flights when done in concert with training missions. They have detected eight fires this year. The only problem is that COHDEFOR uses a grid system that does not coincide with sectional maps used by the military and thus, some confusion exists in the exact location of fires. The Region has formalized this with an Agreement that expands on the National Honduran Military Agreement.

The budget is prepared in June for the following year. Management Units work with the Region on the Regional proposals. The Regional Director is responsible for the cuts and the final allocation when sent back to the Region. Reductions can be 20% - 25%. Eighty percent of the budget received for protection is paid out in salary, the balance going for support items. Capital purchases (vehicles and tools) are controlled at the National level. In extreme emergency situations, the



Region may be able to get funds added to a Regional budget to cover the emergency. These funds usually come from another allocation such as insect control.

The Region has also worked with two local manufacturers for the fabrication of fire tools. They have been successful in obtaining McLeods, Council Rakes and Fire Swatters at a slightly lower cost than those manufactured in Comayagua. They had recently received tools from the private sector through the Commission of the Valley of Sula, which is a CARE Project.

We traveled to Macuelizo, a Management Unit in the Region. The Protection Chief for this Unit is a recent graduate from ESNACIFOR filling her first job with COHDEFOR. This Unit has one of the only weather stations we had seen on our trip. They are recording the daily wind direction and velocity, temperature and relative humidity. They use Alvarado Index of Fire Danger Rating but we were unable to correlate index components or the adjective rating. They do not consider wind velocity, only the relative humidity and temperature. Rainfall that occurs doesn't seem to impact the rating system. The unit contains 36,300 hectares intensive; 21,000 hectares extensive; 19,600 broadleaf, and 42,000 agricultural, a total area of 119,000 hectares with 57,300 under protection.

They have a prescribed burning goal for 1992 of 192 hectares and have accomplished 91 hectares. It is doubtful that they will be able to accomplish their target. In discussing accountability in goal accomplishment with Miguel Salazar, he told us that there is no problem in performance for goals or targets not met. If a prescribed fire escapes, it automatically becomes a wildfire without any apparent accountability for the escape. The Unit Protection Chief writes and approves the Burn Plan. We also had an opportunity to observe the Brigades in action on a small (about one hectare) prescribed burn to reduce fuel loading. The typical prescribed fire cost in the Macuelizo Unit for a six hectare is L 192.43 total or L 32.07 cost/hectare.



April 25, 1992

Traveled from San Pedro Sula Tela. Enroute we toured the COHDEFOR Botanical Preserve, Lancetilla. The reserve has many different species of tropical plants from all over the world. The area between San Pedro Sula and Tela is predominantly tropical forest and agricultural. Only a very minor fire problem occurs.

April 27, 1992

Departed from Tela and returned to Tegucigalpa. Enroute we stopped at ESNACIFOR and picked up a copy of a Fire Effects document by Terry Wolfsohn that had been reproduced by the school's library.

April 28, 1992

Met with Danilo Escoto, the PDF Director at COHDEFOR, on questions regarding area of responsibility. The budget for PDF is approximately L 3,500,000 and includes funds from both U.S. AID and COHDEFOR. The approval process begins with the submissions from the Units. Danilo works with the Unit Chiefs on their submissions and forwards the proposal, with recommendations, to the COHDEFOR General Manager. After review and concurrence, the proposal is sent to U.S. AID, then to the Minister of Natural Resources, for final approval. The budget has a relationship to the planning process and the approved Project Management Plan.

There is a Project Management Plan for the PDF project by year to the end of the project. COHDEFOR has had a change in philosophy from the origin of the project. Originally it was a priority for timber harvest, now it is more protection orientated.

There is no specific breakdown for the protection portion, but Danilo feels that up to 80% of it should be protection funds in the future. He has no estimate of the current allocation.

Education in the community projects is probably the most important aspect of protection within the Project. They are striving to reach the young population. Older people are not as responsive to changes and have been raised with a culture that creates protection problems in the country.



The remainder of the day was spent with the compilation of data for the development of the final report and recommendations.

April 29, 1992 Spent the day in the COHDEFOR Office on the development of our final report and recommendations.

In the evening we attended a working social at the home of Jack Robinson, Economic Officer, U. S. Embassy. The purpose of the meeting was to exchange and share information with other people from the United States and Honduras with an interest in conservation, the environment, and fire protection in Honduras.

April 30, 1992 Provided a briefing to personnel from U.S. AID and COHDEFOR on the preliminary findings and recommendations that will be made in our final report. The briefing was to provide information and receive feedback on these recommendations as well.

Spent the day in the COHDEFOR Office on the development of our final report and recommendations.

May 1, 1992 Met with Ramon Alvarez, U.S.AID, to further discuss the report and the desired format.

This is a National Holiday (Labor Day) in Honduras. All government offices, banks, and a number of businesses are closed. Spent the day at the Hotel San Martin working on the draft of the report and recommendations.

May 2, 1992 Departed Tegucigalpa and returned to the United States.



Department of the Interior  
Training Team Report  
Honduran Detail

Clyde Stoneaker, Ron Morfin, Jesus Robles and Tony Beltran, spent approximately five weeks training initial attack fire crews in Honduras. The following recommendations, are offered to help improve the effectiveness of the fire suppression operation in Honduras.

### Training

We found that the fire fighters have the basic skills necessary to suppress fires. A chain of command structure needs to be implemented and the fire fighting manual needs to be followed.

An annual suppression school for the Crew Bosses including safety, communications, first aid, fire behavior and suppression tactics should be developed. Crew Bosses who attend need to share their knowledge from their suppression training with each crew.

### Communication

Communications fluctuated between semi-efficient and total inefficiency. The inefficiencies were caused by lack of radios, dead batteries, slow turn-around time on repairs, no spare parts and poor radio discipline. Communication Planning, repair and maintenance cycles and training on use of the radio system is needed.

A program for teaching safety and First Aid needs to be implemented for fire fighters. Each crew needs to have a First Aid Kit with them when they are in the field on suppression or doing project work.

### Equipment

Each fire fighter should be equipped with a hard hat with a chin strap for basic fire line safety and riding in the back of open trucks.

A fire-resistant long-sleeved shirt and denim trousers should be a standard issue to all fire fighters. This will contribute to fire line safety and add a team spirit to the Brigades. Gloves and boots were a rarity and should be a standard safety issue. Honduran military-style jungle boots are of good quality and cost approximately \$21.00 in Honduras.

Two canteens with a carrying case should be issued to each fire fighter. At least 5 gallons of water should be carried in reserve on each truck to replenish drinking water used throughout the day.



The rubber back pack pumps work well and are more acceptable to the fire fighters' use than the metal pumps currently provided. These should be provided when the existing metal back pack pumps are replaced.

All tools used by COHDEFOR need to be backed-up by two in reserve. Currently, repairs on tools is accomplished on the fire line when replacement parts are available.

Buying as much equipment possible from local sources will benefit the overall economy of Honduras. It will also put the tools in the hands of the Brigades quicker than orders made from the United States.

Though strong and motivated, we believe that until the basic equipment and training needs are fulfilled there will not be a fire fighting force able to improve the fire problems of the country.

### Detection

A system for detection (lookout and roving motor and aerial patrols) needs to be established and agreed upon in Honduras.

A Standard Operation Procedure for lookouts needs to be developed, including simple weather observation techniques, radio discipline, and procedures for reporting and recording fire activity. The lookouts currently do a good job, but a system needs to be developed that will refine and organize the position. They need proper tools to do their job; currently, they use home-made wooden type fire finders. The home-made variety is better than nothing but it does provide a great margin for error in reporting.

### Maintenance

Maintenance on vehicles and tools needs to be accomplished by full-time support personnel. Vehicles get serviced periodically, but this is not a scheduled event. To prolong the life of tools and equipment some type of service schedule needs to be agreed upon. Tools need to be cared for and repaired or replaced as they become damaged or worn.

At this time, there are no replacement hand tools. At least two of each type of hand-tool should be warehoused to provide immediate replacement and reserve tools.

### Safety

Currently, the Brigades ride standing in the back of vehicles or sit on the edge of the vehicle bed. Benches and/or tool boxes that can double as benches need to be provided. A safe but steady speed limit needs to be enforced for all travel.



All Forest Camps need a Safety plan, including a fire escape plan. A First Aid Kit and an adequate fire extinguisher should be part of planning and equipping the camps.

### Picacho Area

Picacho is an unique urban forest area that may experience severe property damage and possible loss of life when the fire conditions are extreme. Picacho is within 40 minutes of the COHDEFOR offices in Tegucigalpa, but there is no efficient communications with the Fire Brigades at the Picacho Forest Camp. There is no forest fire reporting system at the COHDEFOR offices. Fires often go unreported for several hours before suppression action is taken.

The COHDEFOR fire suppression system begins to fall apart within the city limits of Tegucigalpa and gets even worse as you move away from the main office. If an efficient operation cannot be formed in the city where there is water, telephones, etc., it will be even more difficult to accomplish efficiency in the remote areas. A plan for suppression response in Tegucigalpa and other areas must be developed.

### Future Department of the Interior Details to Honduras

We strongly urge that a Spanish-speaking radio technician with tools, parts, and test equipment be sent to evaluate and begin to bring the radio system on line. This needs attention immediately.

Future training/suppression groups should come at the beginning of fire season (mid-February) so problems can be identified and training can be accomplished before active fire suppression is undertaken.

Basic fire fighting and safety equipment needs to be provided to all Brigade members through continued donation from U.S. AID or appropriate Honduran procurement.

Personnel and staffing needs to be increased in the Brigades so an adequate reserve force is available. Currently, the entire suppression load is carried by one Brigade per unit. Because of the lack of staffing, fires cannot be attacked when small.

### Conclusion

There are many problems with the present COHDEFOR fire fighting system. We have discussed the more obvious problems involving the lack of adequate training, safety, tools and equipment.







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